

CLAIMS

1. Foamed polycrystalline silicon which has bubbles therein and an apparent density of 2.20 g/cm^3 or less.

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2. The foamed polycrystalline silicon of claim 1 which is in the form of an assembly of independent grains or an agglomerate of independent grains.

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3. The foamed polycrystalline silicon of claim 2, wherein the assembly of independent grains contains independent grains each having a weight of 0.2 to 2 g in an amount of 50 g or more based on 100 g.

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4. The foamed polycrystalline silicon of claim 2, wherein the assembly of independent grains is formed by breaking up the agglomeration of an agglomerate of independent grains.

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5. The foamed polycrystalline silicon of claim 1, wherein a plurality of independent bubbles are contained and are existent in a center portion of a grain.

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6. A crushed product of the foamed polycrystalline silicon of claim 1.

7. The crushed product of claim 6 which has an average grain diameter of more than 200 μm and 5 mm or less.

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8. A method of producing foamed polycrystalline silicon comprising naturally dropping droplets of silicon containing hydrogen which has been molten in the presence of hydrogen in 0.2 to 3 seconds and cooling the droplets until hydrogen bubbles are locked up in the droplets.

9. The method of claim 8, wherein natural dropping is carried out for 0.2 to 2 seconds.

10. The method of claim 8, wherein a silicon deposition
5 reaction between hydrogen and a chlorosilane and a reaction for melting the deposited silicon in the presence of hydrogen are carried out simultaneously to prepare silicon droplets containing the hydrogen.

10 11. A polycrystalline silicon production apparatus comprising:

(a) a cylindrical vessel having an opening which is a silicon take-out port at the lower end;

15 (b) a heater for heating the inner wall from the lower end to a desired height of the cylindrical vessel at a temperature equal to or higher than the melting point of silicon;

20 (c) a chlorosilane feed pipe which is composed of an inner pipe having a smaller outer diameter than the inner diameter of the cylindrical vessel and constituted such that one opening of the inner pipe faces down in a space surrounded by the inner wall heated at a temperature equal to or higher than the melting point of silicon; and

25 (d) a first seal gas feed pipe for supplying seal gas into a space defined by the inner wall of the cylindrical vessel and the outer wall of the chlorosilane feed pipe.

30 12. The apparatus of claim 11 which further comprises (e) a hydrogen gas feed pipe for supplying hydrogen gas into the above cylindrical vessel.

13. The apparatus of claim 11, wherein a cooling acceptor for receiving droplets falling from the lower end of the cylindrical vessel is disposed in a lower portion of the

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cylindrical vessel with a space therebetween.

14. The polycrystalline silicon production apparatus of any one of claims 11 to 13 further comprising a closed vessel
- 5 which covers at least a lower end portion of the cylindrical vessel, forms a space in the lower portion of the cylindrical vessel and is provided with an exhaust gas discharge pipe, and a second seal gas feed pipe for supplying seal gas into a space defined by the outer wall of the cylindrical vessel
- 10 and the inner wall of the closed vessel.

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